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United States Patent [19]**Kownacki et al.**[11] **Patent Number:** **6,006,517**[45] **Date of Patent:** **Dec. 28, 1999**[54] **PNEUMATIC ENGINE**[75] **Inventors:** **Charles D. Kownacki, Erie, Pa.;**
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Canada[21] **Appl. No.:** **09/178,595**[22] **Filed:** **Oct. 26, 1998****Related U.S. Application Data**[60] **Provisional application No. 60/081,045, Apr. 9, 1998.**[51] **Int. Cl.⁶** **F16D 31/02**[52] **U.S. Cl.** **60/370; 60/407; 446/180;**
446/211; 446/225[58] **Field of Search** **60/370, 407; 124/57,**
124/70, 74; 137/588; 141/3, 20, 346, 347,
348, 349; 446/37, 56, 57, 176, 180, 181,
186, 187, 211, 207, 218, 225[56] **References Cited****U.S. PATENT DOCUMENTS**

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A fluid engine for use in pneumatically operated toys such as wheeled vehicles or airplanes includes an engine having a fluid input cavity which is in continuous fluid communication with a source of compressed air, a fluid delivery cavity which is in continuous communication with a piston cavity bounded by a moveable piston mounted in a cylinder member and which is separated from the fluid input cavity by a wall having a valve opening, and exhaust apertures which are separated from the fluid delivery cavity. A valve rod is movably housed to open the valve opening and close the exhaust apertures during the piston's power stroke, and to close the valve opening and open the exhaust opening during the piston's exhaust stroke. The valve rod is operatively connected to a piston to act in synchronism with it by the use of a cam integrally secured to a propeller power shaft.

10 Claims, 6 Drawing Sheets